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DSM NETWORK'S SPECIAL WEBINAR

PROGRESS IN CORROSION MODELING FOR PREDICTION, MITIGATION AND REPAIR

CORRDESA LLC

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PERSONAL PROFILE

ALAN ROSE

Alan's BSc is from the University of Manchester, and his PhD from the University of Sheffield.

As CEO of Corrdesa, Alan works with commercial and military customers, developing software tools and knowledge to enable Corrosion Resistant Design. Corrdesa has developed a unique electrochemical database which is implemented in their 1D software product Corrosion Djinn® and also in their 3D, corrosion simulation work using Siemens CCM+. Alan has implemented electrochemical simulation into corrosion prediction and scale-up of electrochemical processes used in manufacturing such as electrochemical machining and surface finishing operations such as plating and anodizing.

KEITH LEGG

Keith's BA is from the University of Lancaster, and his PhD from the University of York. He is a globally acknowledged expert on coatings, and their testing and validation for aerospace and defense, Keith ensures that Corrdesa's R&D addresses the challenge of escalating material development needs in response to the increasing demand for enhanced performance requirements whilst being limited by ever more restrictive compliance legislation. Corrdesa then identifies and develops promising technologies to meet and satisfy those needs. He is a DoD Subject Matter Expert on chromates and a member of the F-35 Corrosion Prevention Advisory Board.

ALAN ROSE

COMPUTATIONAL CORROSION PREDICTION – THE NEW DISCIPLINE

ABSTRACT

Why bother with computational corrosion methods? Globally, corrosion costs about 4% of gross domestic product and studies have shown that about 30% of these costs can be avoided with better upfront design and material selection. In addition it is now the law! YES, for US federal military acquisitions it is now a requirement for the system vendor to put in place a Corrosion Prevention Control plan which, DoD Instructions state, must include corrosion modeling and testing.

In this presentation Alan will discuss the challenges in implementing corrosion analysis capabilities across enterprises. This will be supplemented with an introduction and demonstration of corrosion analysis tools using examples.

KEITH LEGG

NON-DRIP BRUSH PLATING AND ANODIZING

ABSTRACT

Brush plating has been used since the 1930s as a way of repairing electroplated components without disassembling, stripping and replating. It is heavily used in the aerospace and defense industry for repairing coatings such as Cd plate for corrosion control. It has tended to be a crude, messy process, often involving toxic chemicals that drip and run. Typically it has few controls and the quality of the coating is highly operator-dependent. With the increasing emphasis on environmental and occupational health, and ensuring material and process quality, this type of approach is no longer acceptable. As a result non-drip brush plating and anodizing have been developed by the French company Dalic, and the process has been further developed and brought into large-scale use in the US by Corrdesa. The non-drip process keeps all the chemicals in a closed-loop to protect both the operator and the vehicle he is working on.

We have developed a combination of computational fluid dynamics and computational electrodynamics modeling to design new tooling, while we use computational corrosion analysis to match coating materials to corrosion requirements. With these improvements, we now see the potential for expanding brush plating and anodizing far beyond spot repair of damaged coatings, by using our computational corrosion approach to evaluate required corrosion performance and the coatings needed to achieve that performance. Then applying the non-drip plating approach to protect critical areas of very large components, from internal and external aircraft surfaces to rockets and nuclear fuel disposal containers.